

CLAIMS

What is claimed is:

- 1 1. An apparatus comprising:
2 an input to a microchannel cooling subsystem to receive a fluid flow:
3 a pumping mechanism coupled to said input of said microchannel
4 cooling subsystem to provide said fluid flow, and to cause a turbulence in
5 the fluid flow inside said microchannel cooling subsystem to clear a vapor
6 lock in the fluid flow inside said microchannel cooling subsystem.

- 1 2. The apparatus of claim 1, wherein the pumping mechanism
2 comprises a pump and a bubble generator with said pump coupled to said
3 input of the microchannel cooling subsystem to provide said fluid flow at a
4 first pressure level, and said bubble generator coupled to said input of said
5 microchannel cooling subsystem to cause said turbulence in the provided
6 fluid flow inside said liquid to said microchannel cooling subsystem.

- 1 3. The apparatus of claim 2, wherein said pump is selected from a
2 group consisting of an electrokinetic (ek) pump, a vane pump, a piston pump
3 and a diaphragm pump.

- 1 4. The apparatus of claim 2, wherein said bubble generator is adapted
2 to generate one or more bubbles during a period of time sufficient to cause
3 the pressure of said provided fluid flow to increase from said first pressure
4 level to a second pressure level for said period of time to cause said
5 turbulence in said provided fluid flow inside said microchannel cooling
6 subsystem.

- 1 5. The apparatus of claim 4, wherein said bubble generator further
2 comprises a chamber to contain a second fluid, an input port to receive said

3 second fluid, an output port coupled to the input of said microchannel
4 cooling subsystem to output said second fluid for said microchannel cooling
5 subsystem, and a heater to heat said second fluid, changing a volume of
6 said second fluid from a fluid state to a gas state within said period of time,
7 to cause said turbulence in said provided fluid flow inside said microchannel
8 cooling subsystem.

1 6. The apparatus of claim 5, wherein said input port of said bubble
2 generator is coupled to said pump, and said second fluid is a diverted
3 portion of the provided fluid flow.

1 7. The apparatus of claim 5, wherein said heater is activated by an
2 active feedback controller.

1 8. The apparatus of claim 1, wherein the said microchannel cooling
2 subsystem comprises a cold plate having a microchannel.

1 9. The apparatus of claim 1, wherein the apparatus further comprises
2 said microchannel cooling subsystem, including a plurality of microchannels.

1 10. The apparatus of claim 1, wherein the apparatus further comprises
2 said microchannel cooling subsystem; and
3 a microelectronic die thermally coupled to said microchannel cooling
4 subsystem, to be cooled by the microchannel cooling subsystem.

1 11. The apparatus of claim 10, wherein the microelectronic die is a
2 microprocessor.

1 12. A method comprising

2 supplying a microchannel cooling subsystem with a fluid flow at a first
3 pressure; and
4 cooling subsystem to clear a vapor lock in said provided fluid flow
5 inside said microchannel cooling subsystem..

1 13. The method of claim 12, wherein said causing comprises causing the
2 pressure of the fluid flow to change for a period of time.

1 14. The method of claim 13, wherein said causing of the pressure change
2 comprises generating one or more bubbles in a second fluid to be combined
3 with the provided fluid flow, during said period of time.

1 15. The method of claim 14, wherein said generating comprises heating
2 the second fluid.

1 16. The method of claim 15, wherein the second fluid is a diverted portion
2 of the provided fluid flow, and the method further comprises diverting the
3 provided fluid flow.

1 17. A system comprising:
2 an IC package including a microchannel cooling subsystem adapted
3 to receive a fluid flow;
4 a pumping mechanism coupled to said microchannel cooling
5 subsystem of said IC package to cause a turbulence in said provided fluid
6 flow inside said microchannel cooling subsystem to clear a vapor lock in
7 said provided fluid flow inside said microchannel cooling subsystem; and
8 a networking interface coupled to the IC package.

1 18. The system of claim 17, wherein the pumping mechanism comprises
2 a pump and a bubble generator, with said pump coupled to the

3 microchannel cooling system to provide said fluid flow at a first pressure
4 level, and said bubble generator coupled to the microchannel cooling
5 system to cause said turbulence in the provided fluid flow inside said
6 microchannel cooling subsystem.

1 19. The system of claim 18, wherein said pump is selected from a group
2 consisting of a vane pump, a piston pump and a diaphragm pump.

1 20. The system of claim 18, wherein said bubble generator is adapted to
2 generate one or more bubbles during a period of time to cause the pressure
3 of said provided fluid flow to increase from said first pressure level to a
4 second pressure level for said period of time to cause said turbulence in
5 said provided fluid flow inside said microchannel cooling subsystem.

1 21. The system of claim 18, wherein said bubble generator comprises a
2 chamber to contain a second fluid, an input port to receive said second fluid,
3 an output port coupled to the microchannel subsystem to output said second
4 fluid, and a heater to heat said second fluid, changing a volume of said
5 second fluid from a fluid state to a gas state within said period of time, to
6 cause said turbulence in said provided fluid flow inside said microchannel
7 cooling subsystem.

1 22. The system of claim 21, wherein said input port of said bubble
2 generator is coupled to said pump, and said second fluid is a diverted
3 portion of the provided fluid flow.

4 23. The system of claim 22, wherein said heater is activated by an active
5 feedback controller.

- 1 24. The system of claim 17, wherein the said microchannel cooling
2 subsystem comprises a cold plate having a microchannel.
- 1 25. The system of claim 17, wherein said microchannel cooling
2 subsystem includes a plurality of microchannels.
- 1 26. The system of claim 17, wherein the system is selected from a group
2 consisting of a set-top box, a DVD player and a server